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HOW WERE THE GLASS FLOWERS MADE?

A LETTER BY MARY LEE WARE

A WORD OF EXPLANATION

The Ware Collection of Blaschka Glass Models of Plants — popularly called the "Glass Flowers" — is undoubtedly the most widely known and appreciated public attraction at Harvard University. An estimated third of a million people annually visit the Botanical Museum where they are housed.

The question which visitors most frequently ask is: "How were these beautiful flowers made?" Another query often heard is: "Has the secret been lost — did it die with the makers?"

The truth is that there was no secret process employed by Leopold Blaschka and his son, Rudolph, the creators of the "Glass Flowers." Every techniqne used was known to glass workers of the period. According to Mr. Louis C. Bierweiler, former Curator of Botanical Collections at the Museum and for more than fifty years custodian of the models, Rudolph Blaschka expressed to him his regret that many people thought that his handiwork utilized secret processes; he insisted that his work represented art in which there is no room for secrecy or egoism.

Although there is no complete information on all steps in the manufacture of the models, we do have the description of part of the work in a letter from the late Miss Mary

Lee Ware of Boston to Professor Oakes Ames, then Director of the Museum. This letter not only contains significant remarks about the technique involved in the glass work but gives an intimate picture of the artist, Rudolph Blaschka, and his wife in their home. It was written on her last visit to the Blaschkas in 1928. Miss Ware, and earlier her mother, Mrs. Elizabeth C. Ware, financially supported the botanical work of Leopold Blaschka from 1877 to 1895 and subsequently Rudolph until his retirement in 1936. In 1893, the Wares presented the collection to the President and Fellows of Harvard College as a memorial to Charles Eliot Ware, M.D., of Boston, a member of the Class of 1834.

Miss Ware's letter is herewith reproduced almost in its entirety and with only minor editorial alterations. The original is preserved in the Botanical Museum.

R.E.S.

Dresden, Oct. 3rd., '28

Dear Professor Ames,

It seems easiest in this very long letter to separate the description of the glass work itself from the more personal part; so I have done this, and I will tell you about making the models later. I have been out to Hosterwitz, half an hour by auto, alone four times and have passed the whole afternoons, long ones, looking first at the models. It took two afternoons to see them. Then I inspected the work room and its contents and was shown all the great improvements made by the Blaschkas in the house since his marriage, and finally accepted their hospitality of tea and delicious cakes, a far better arrangement than the old one of spending a whole day and having two solid meals!

Both Mr. and Mrs. Blaschka received me most cordially at the little garden gate, and we looked at each other to see what time had done; that first day, I was daunted to see what seemed a little old man, legs that were not strong, very rounded, stooping shoulders and an exceedingly white face. He must have dropped nearly two inches in height, his hands were somewhat out of shape from rheumatism and were very trembling. However, I came to the conclusion that this was due partly or largely to excitement at seeing me again and anxiety as to what I should say about the models.

When I was ready to leave and said "Aufwiedersehen," he drew himself up with quiet dignity and said, "Well, Miss Ware, are you satisfied?" I said, "Yes, Mr. Blaschka, I am more than satisfied, and I do not see how anyone could feel otherwise." He looked intensely relieved at once, and the next time I went out, his color had returned, and, when she saw him, Miss Niklason thought he looked well and strong, barring the stoop

which, I suppose, is inevitable with such sedentary work.

His eyes are simply marvelous, piercing; and yesterday, while painting a leaf, he worked most of the time without glasses, and he is seventy-one! He speaks freely of his age, of the work which can possibly still be accomplished and of the fact that he is the only one in the world who can do it; which I think is true. You would never find another man who combined the scientific knowledge of many years' study of plant and animal life; the study of glass, its component parts and its possibilities, not merely book knowledge but derived from experiment as well; together with the power of concentration, mental and moral; the artistic ideal as a loadstar which has enabled him to forego everything called pleasure, except his wife. She is sweet and devoted to his ideal, too, has softened and broadened him, and so humanized him that he is much better fitted to come in contact with the world than the Rudolph Blaschka who came to America in 1896.

He is just as modest and absolutely honorable as he ever was, but now he has a sense of his own worth, his own unusual force of intellect and character; and there is everything to justify that. I asked him one day whether he was still applied to for models to be kept in Germany, and he said, "Oh yes." Professor Neumann, to whom he went for something at your suggestion, asked why he would not give them some of his work. I asked what he replied. "Oh," he said, "I told him that I worked for Harvard University, that I was a man of absolute honor so would make no change and was satisfied."

I found that Sunday was his one day of rest and, suspected, from previous knowledge, that he was not taking enough time for air and exercise and was perhaps working late in the evening. I extracted the information that lately he had taken little or no time for fresh air and had

been working evenings, sometimes till midnight. I remonstrated vigorously and told him he must not do so, but he only said Professor Ames wanted the models and tho't him very slow — that it was *impossible* for him to do such work any faster, that no man could. It had evidently worried him much; and I had to work hard to reassure him that you would not feel so if you knew him and could see him work, that I would explain to you and that he absolutely *must* stop evening work and get the necessary air and relaxation to keep himself in good condition.

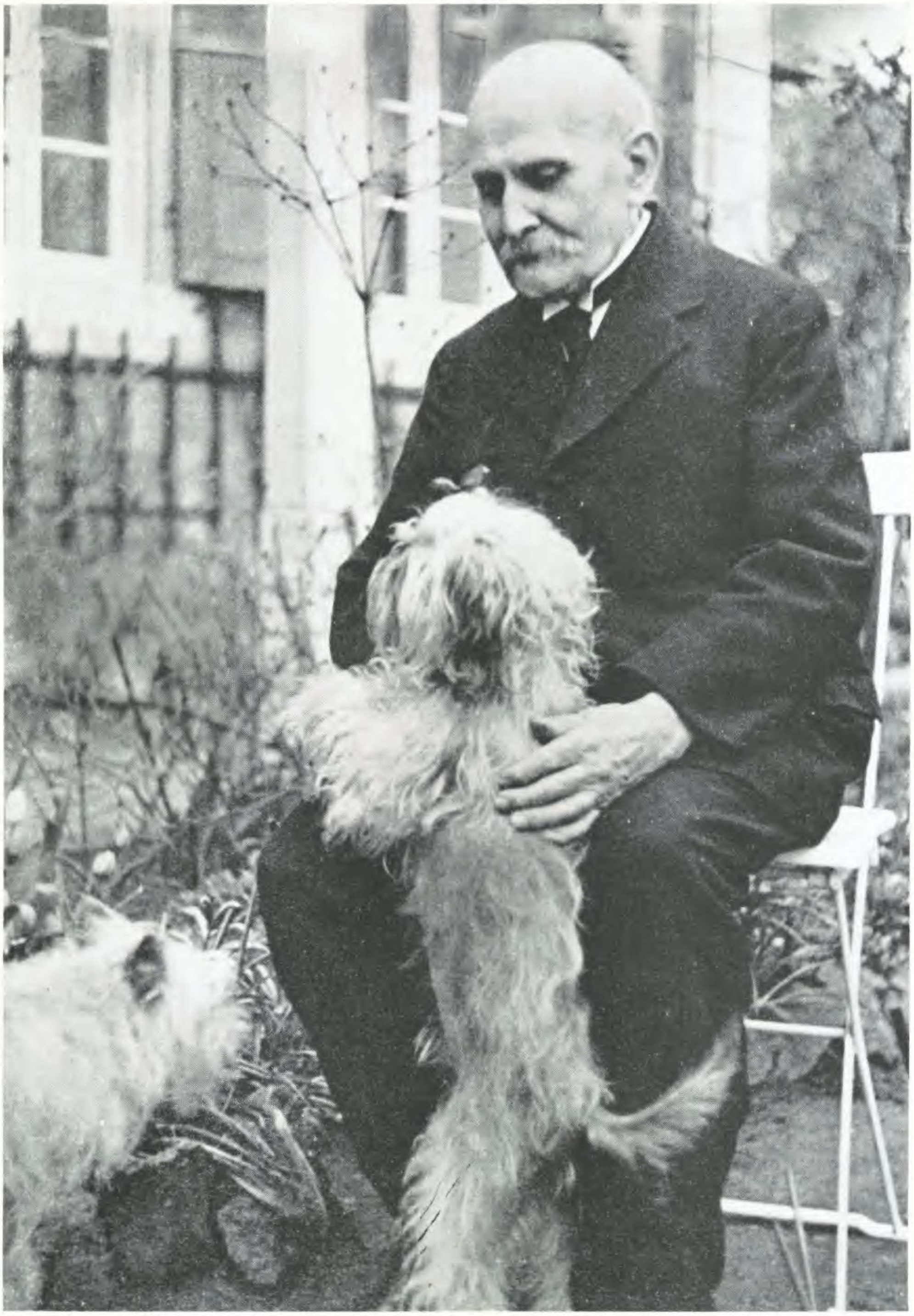
He only regrets that all the groups of fungi, etc., are not complete, but he has had to do them as he could and when he could get the specimens, depending more or less on seasons, weather, etc. He hopes to send off some twenty-five models, sprays or plants with their sections, etc., by the middle of the month — I think it will be nearer the end, but perhaps not. I believe this includes all the pears, except the blossoms, and strawberries; whether more I do not know. Apples, plums, apricots peaches, cherries, are for the most part finished and ready for the sprays, with the leaves ready to paint, and the exquisite fruit blossoms ready for the branches. He thinks the rest can be shipped in the spring, some thirty more. The fruits are not so beautiful to look at as the flowers are, but they are marvellous, and how one man can sit hour after hour, putting in the gossamer veinlets, or all the myriad little dots and irregular brown patches, passes my understanding; you would say that years could not do it, or a lifetime. If he hurried or worked quickly, he would be insane.

I sat and watched his movements as he worked. The table is covered not only with implements but with trays of leaves, formed but not colored, bottles in which he can stand the glass stems with leaves while drying or

cooling, specimens of fungus-covered fruits or dried leaves for use as guides (for the most part he studies them without glasses), bottles with powdered glass for use as needed, and saucers for the enamel paints he makes of powdered glass. In spite of the slightly unsteady hand, his movements are quiet, deft, soft in laying down or taking up where speed or a miscalculated movement might ruin the work of hours. It is breathless to watch.

The first afternoon, I saw the pears in every stage of disease, sometimes the fruit only, sometimes leaves and branches also. The moulds were wonderful, and I think you will be delighted with them all, but, of course, I know nothing of fungi. He had magnified 250 times a section of mould which comes on bread — remarkable. The strawberries were fascinating — plants, fruit and moulds; also the result of frosts on the developing fruit. The apples, also, were good; the peaches in their present stage of development seemed to me less so, but the final varnish was not yet on, and they all looked rather glassy. It all leaves you breathless that anyone can and will do such work.

Mr. Blaschka's head and bearing are very expressive, and I wished I could catch a photograph of his profile as he stood for a few moments, a plaque with a model on it held in both hands. His whole expression of absorbed, concentrated study was worth keeping, had it been possible. His own garden is small but full of fruit trees from which he gets some of his material for work; and the rest he gets from large fruit orchards near by. He also has books on fungi and mushrooms, and is looking forward eagerly to the work for Professor Weston. He says the lamellae will be very difficult but that he can make them. In view of his advancing years and the uncertainty of health, I would suggest that Professor Weston make a list of those subjects which he wants most, those which



RUDOLPH BLASCHKA
June 17, 1857—May 1, 1939
Photograph taken in 1938

are most important, although, on account of weather, season, and materials, it may be impossible for Mr. Blaschka to follow the sequence exactly; still, it would be a guide.

It troubles me very much that he and his wife cannot come over to see his life's work now that you have the models so beautifully arranged, and he looks so eager and pathetic when I describe the *mise en scene*. They are very simple, unaffected, dignified people, and I hope sometime that I may be able to manage it if I can only keep well when I come home. It seems cruel not to, but, of course, they could not travel in our country on what they have. I find that he did not lose all his investments in real estate or mortgages, etc., but *all* in government investments.

One change in the character of his work and, consequently, in the time necessary to accomplish results since I was last here is very noteworthy. At that time, he bought most of his glass and was just beginning to make some, and his finish was in paint. Now he *himself* makes a large part of the glass and *all* the enamels, which he powders to use as paint. This he considers to be practically indestructible, except by force—so that, if we could come back in a thousand years, we would find form and color as today. He has *dozens and dozens* of little bottles with colored powders and little boxes labeled with colored enamels which he makes himself, and powders for paint. The colored enamels are beautiful and fascinating. Some pieces he exposed on his roof or under the eaves for over a year, winter and summer, and they did not change in any way! . . .

My last visit to Hosterwitz on October 6 was most happy. Miss Niklason went with me and enjoyed it as much as I did. Supper was excellent, informal and pleasant, and I regaled them with all the Museum gossip that

I could think up. Mr. Blaschka did some leaf work again and Miss N. felt just as I do, that it is a great experience to watch that man at work. His whole head and hands are a study, and he worked until it was about dark without turning on his electric light. She also felt that the work was enough to wear anyone's nerves to madness, the confined position and closed room being a part of it.

I told him again that he must stop evening work with late hours and must get out for air and exercise for a time every day, that it was not fair to his wife or himself, that it made no difference how long it took to complete the models and that I should tell you that I said so. She is 45 only and perfectly devoted to him, but nobody can keep fresh without a little fun. She said they used to come in to Dresden sometimes when first married but it had been a long time since they were there. I tried to get them in to supper and the opera but unfortunately had to give it up on account of a cold. I know it has given him a fresh start and fresh courage to see me. I have been out there five times and I am sure that I accomplished what I came for. I wish I could have run in oftener, for so few realize what he is doing and their lives are necessarily secluded tho' evidently they are on friendly terms with their neighbors.

And now a word about the way in which he works. I watched while he painted a peach leaf affected by a fungus.

Each leaf is formed of clear white glass, pulled and worked by simple instruments in the flame, and each point on the margin has to be pulled out separately from the hot glass, to make the crenate edge to the degree characteristic of the species.

The leaf remains attached to the long stem of glass, 12 inches perhaps, from which it has sprung, until the coloring is completed and annealed. Then it is separated

and the fine wire, necessary for the permanent stem, is attached, coated with glass, and the leaf is ready to be attached to the branch; this last I could not see, as it took from about three till half after five to color just three leaves and put ribs and veins in one, and then anneal it.

A green leaf would be made of green glass; the method of coloring would be the same for both.

The colors are made of powdered glass mixed (moistened) with a few drops of turpentine or. . . . carefully added to the powder in little china saucers and stirred with a fine camel's hair brush, which, finely pointed in the moist paint, is used to administer the color to the leaf also.

The undulations of the leaf have already been made in the white glass so the buff or yellow paint is brushed on perfectly smooth, several times, and, before it has wholly dried, a strip of pointed whale bone marks the main vein down the centre, and the pointed quill of one of the brushes is used to mark each rib. Then a little of the powdered glass is dusted on by a camel's hair brush, shaken off and dusted on again in spots. If the leaf is partially healthy, faintly colored green glass is applied to the healthy parts. The camel's hair brushes, larger or finer, then are drawn down the vein and the ribs over and over again to give the necessary strength to the vein of size and color and to emphasize, as needed, the ribs. Many, many times the delicate tip of the brush would only touch tiny spots on the lines which needed a thought more of color.

Then, with the most delicate touch of the finest pointed brush, the cob-web veins were drawn into the texture of the leaf, between and at the end of each rib, like fine etching perhaps, but almost more delicate, like a breath rather than a touch and absolutely exhausting to nerves

and patience to continue, till the leaf was completed and ready to anneal.

Two wicks in two cups of parafine were started in front of him, and the flames driven at each other horizontally, his face, nose and mouth, protected by a piece of asbestos.

He took the glass stem in his left hand and inserted the leaf between the flames, where they just met. The tip first, moving it constantly after it had become red hot, till the whole leaf was finished. He keeps his right hand free to manipulate the apparatus or the handle, or guide the leaf if necessary, as he turns and twists it in the flame. Not infrequently, the annealing starts a flaw in the glass, and the leaf breaks so that a great many are necessary to complete a branch. He says that there is far more nervous strain, and it is far slower and more difficult to make a leaf than to make flowers. Annealing the powdered glass, instead of simply painting it, makes the process slower and more dangerous, but the final result is much more permanent; in fact, the color cannot change, and nothing but violence can destroy the model. He can scratch and scrape a leaf with his penknife and it leaves not a mark.

There is additional labor which I did not see. Annealing leaves the glass glittering and shining, and that appearance he destroys by the application of a certain varnish; and he applies this to the flowers also after stamens and pistils are set.

I think he said that he no longer paints at all except with the powdered colored glass which he can anneal. Another complication is that *only a certain kind* of glass can be used for the foundation glass, as the others spring and destroy the coat of anneal. All this is new since I was here nearly twenty years ago. He told me then that he had not at all come to the end of the possibilities of glass work, and these latest models show it to have been true.

The fruits are made over a fine but *very strong* wire, and he says in some of them there is as much as a ½ lb. of glass. That process I have not seen. Most of the fruits I think are done and quantities of leaves on their glass stems ready for painting are in drawers. Some of the fruits are blown, but very few, for he dislikes blowing glass, and the fruits are like eggshells, too perishable for transport. There are one or two sprays, however, with fruit of both kinds on them, and you would never know the difference in their looks.

The large pears and apples looked to me hopeless to transport, for no wire could stay on them, and no paper hold against their weight. But he is confident that by pinning the stalk firmly above the fruit stem it will never move. He has ordered a very heavy weight for the cardboard boxes.

This certainly has been a "long letter," and I shall be very anxious to know if you receive it safely, but please do not feel obliged to write when you are tired and busy —much as I always enjoy your letters.

Please remember me to Louis and, with most cordial greetings to you and Mrs. Ames,

Very sincerely yours,

MARY LEE WARE